Evaluating Safety Results from Capstone Phase 1

an Interim Assessment of 2000-2001

Worth Kirkman

3rd Integrated CNS Technologies Conference
May 21, 2003

Capstone: Improve the Safety of Aviation in Alaska

- Joint Initiative by FAA Alaska Region and Industry
- Advanced Avionics
  - GPS/Terrain, Weather-in-the-Cockpit, ADS-B/CDTI
- Ground Infrastructure
  - ADS-B Surveillance, FIS-B, AWOS
- ATC and Procedures
  - Radar-Like Services, GPS Instrument Approaches

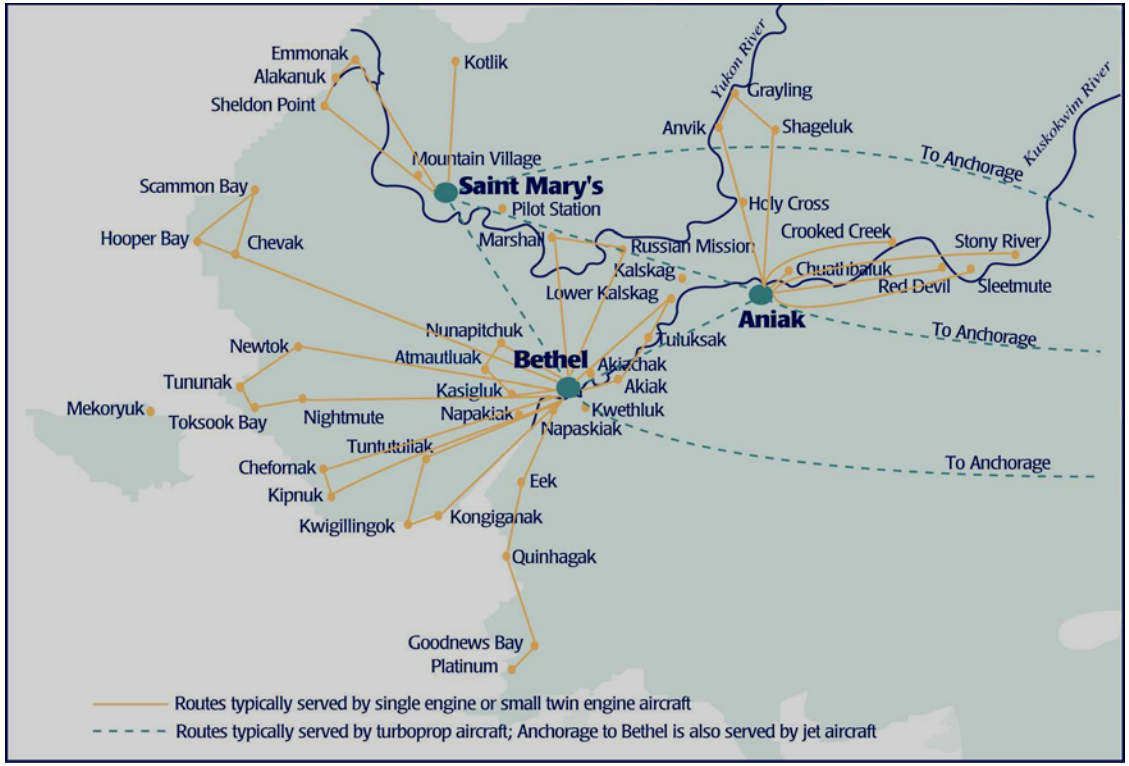
Aviation in Alaska

- One in 58 Alaskans is a pilot
- Rural Transportation = Aviation
  - Routine: nearly all travelers, most cargo
  - Emergency: health, public safety, critical equipment
- Aviation Infrastructure and Services
  - Limited compared to Lower-48

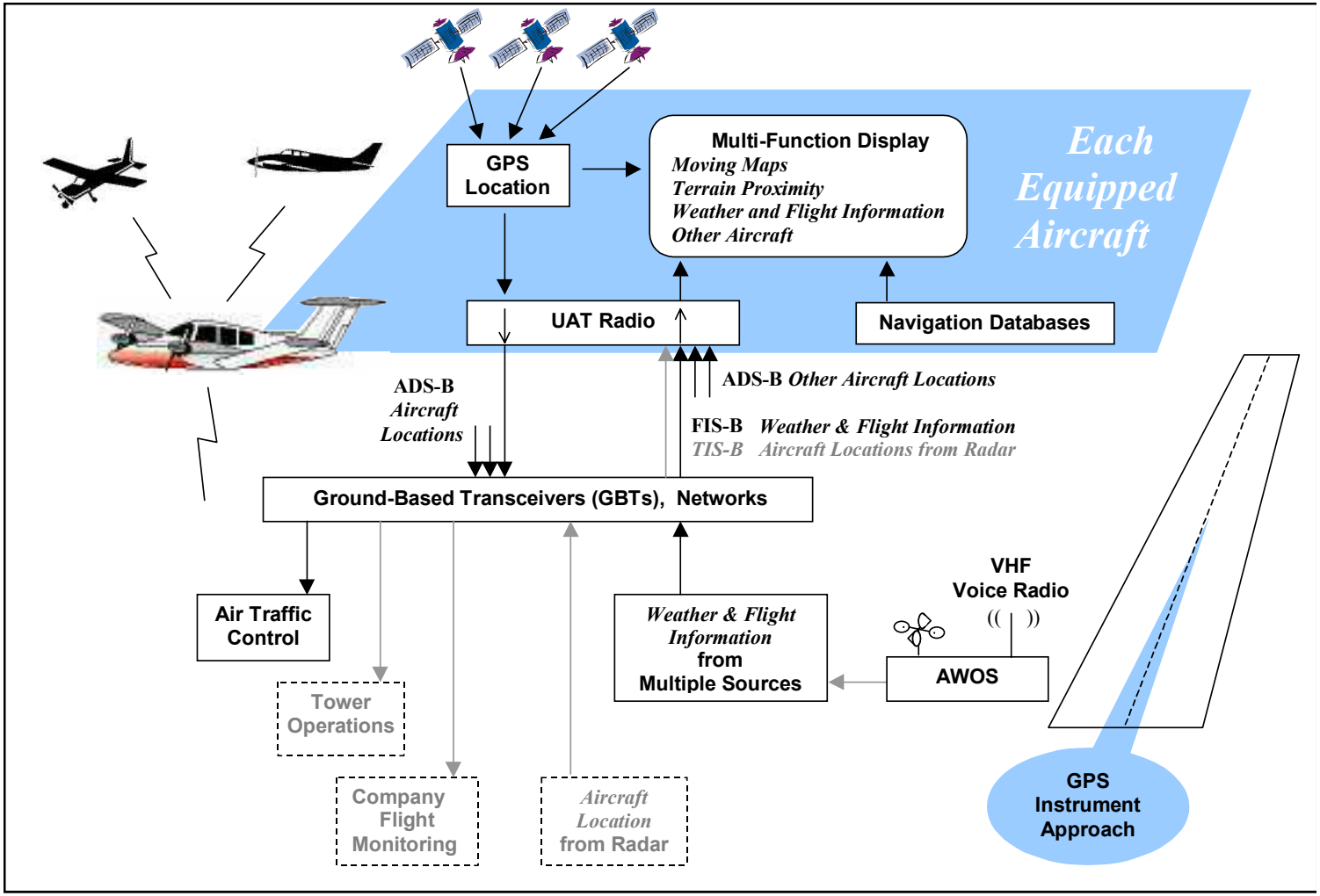
    (Alaska is large and sparse with terrain that can block radar/radio)
- Accident Rates
  - An accident every two days, a fatality every nine days
  - Commercial aviation accident rate is 2.5 times the Lower-48
  - In a 30-year career, 11% of commercial pilots die in their aircraft, 4 times the Lower-48

Capstone Phase 1 in the Yukon Kuskokwim Delta

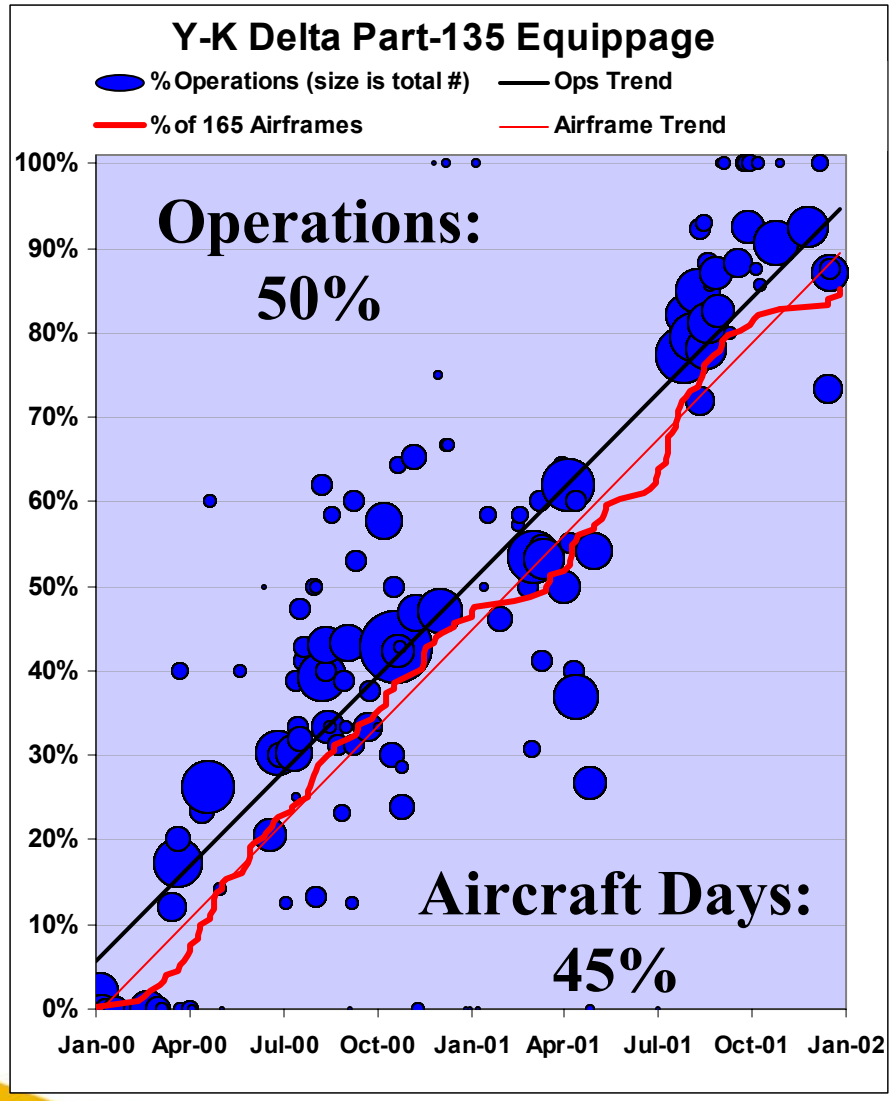
- SW Alaska, centered on Bethel
  - Relatively isolated "pocket" of operations
- FAR Part-135
  - ~ 200 Aircraft
- Voluntary
  - FAA provided Avionics

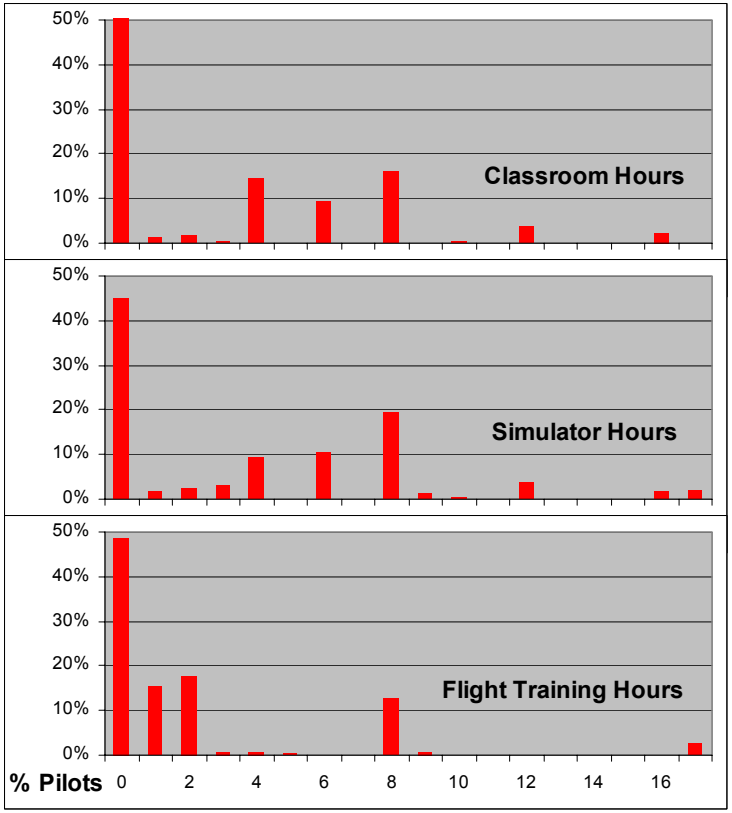


Overview of Capstone Capabilities



2000-2001 Progress on Implementation

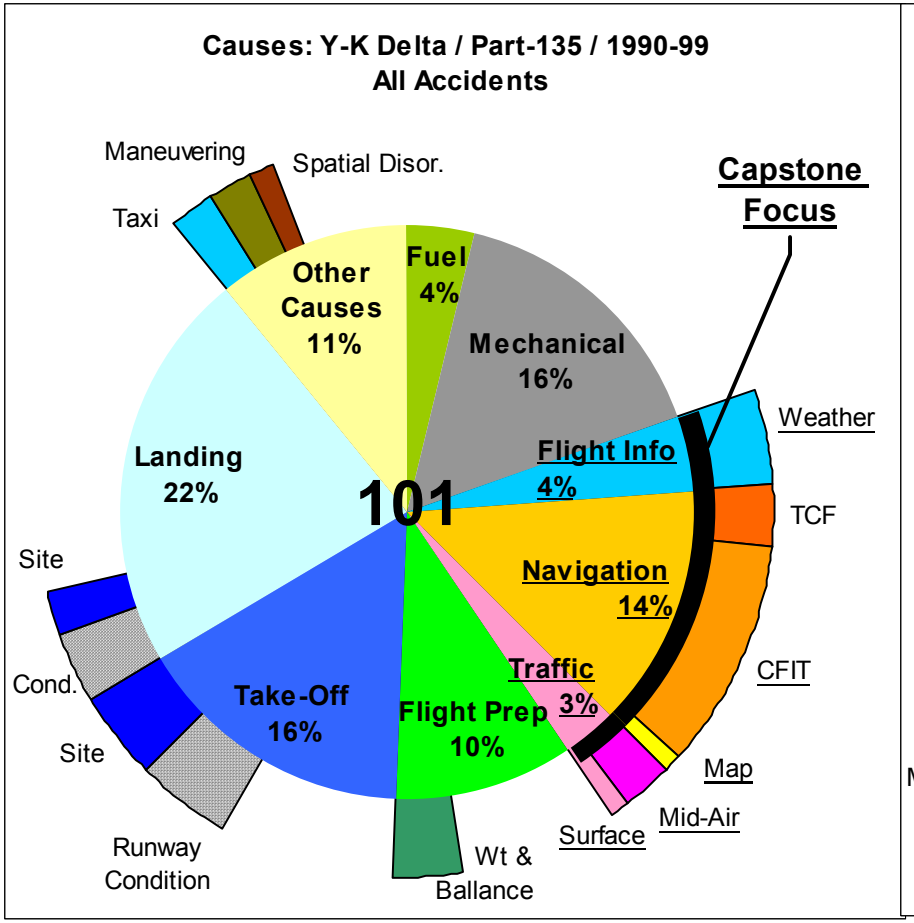


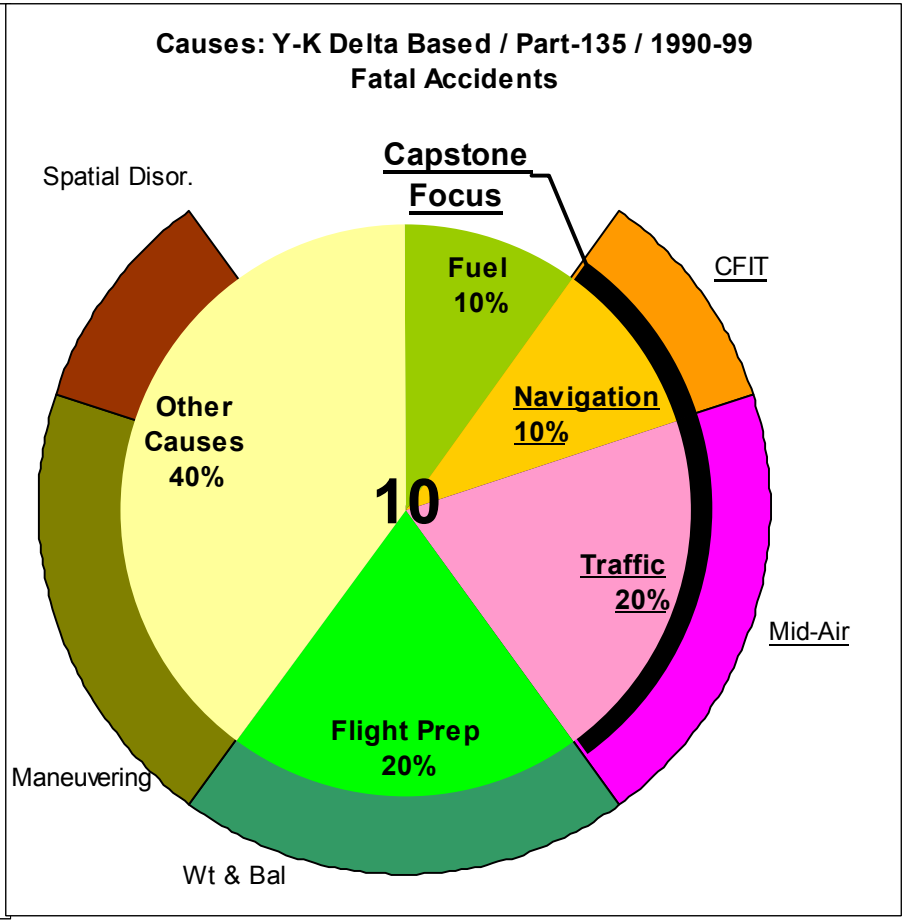


Training Effectiveness: ~ 50%

Accidents and Fatal Accidents Before Capstone

YK Delta / Part-135 / 1990-1999





MITRE

CAASD

Anticipating Accident Rates With Capstone

Formulas for Projections

- **Project numbers of accidents:**

  Historical accidents X growth in operations

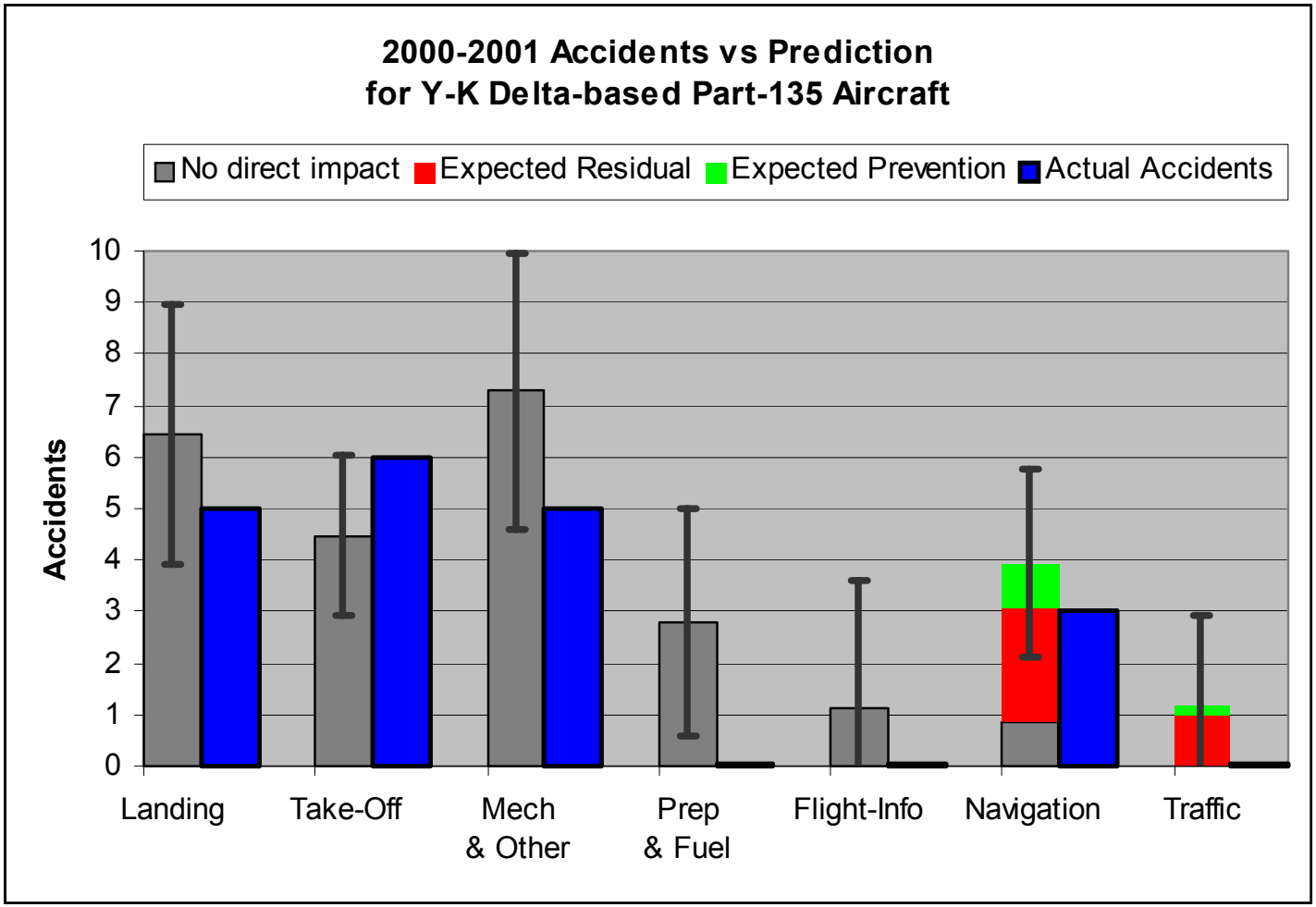
- **Project reductions in navigation and traffic accidents from:**

  % of Aircraft operations equipped
  X % of *Other* aircraft equipped (affects traffic only)
  X % of Pilots adequately trained
  X % of Historical accidents in preventable sub-categories
  X Assessed effectiveness for historical accident narratives

- **Weather and other categories should benefit, but effectiveness could not be quantified from historical narratives**

Anticipated vs. Observed Accidents

YK Delta / Part-135 / 2000-2001

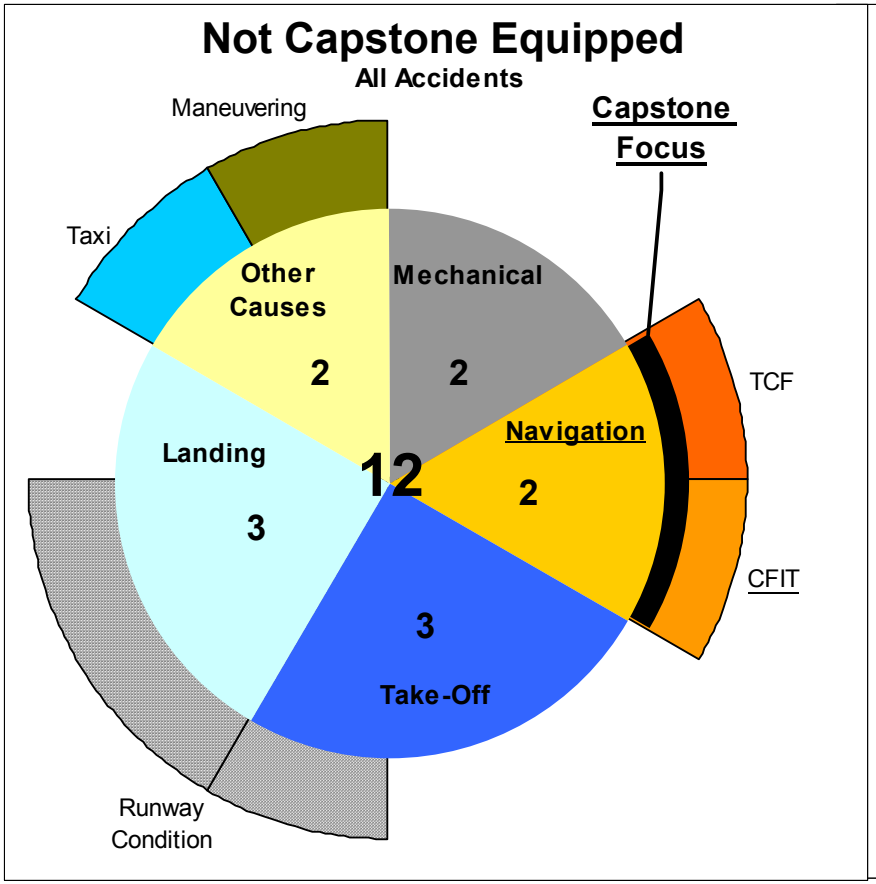


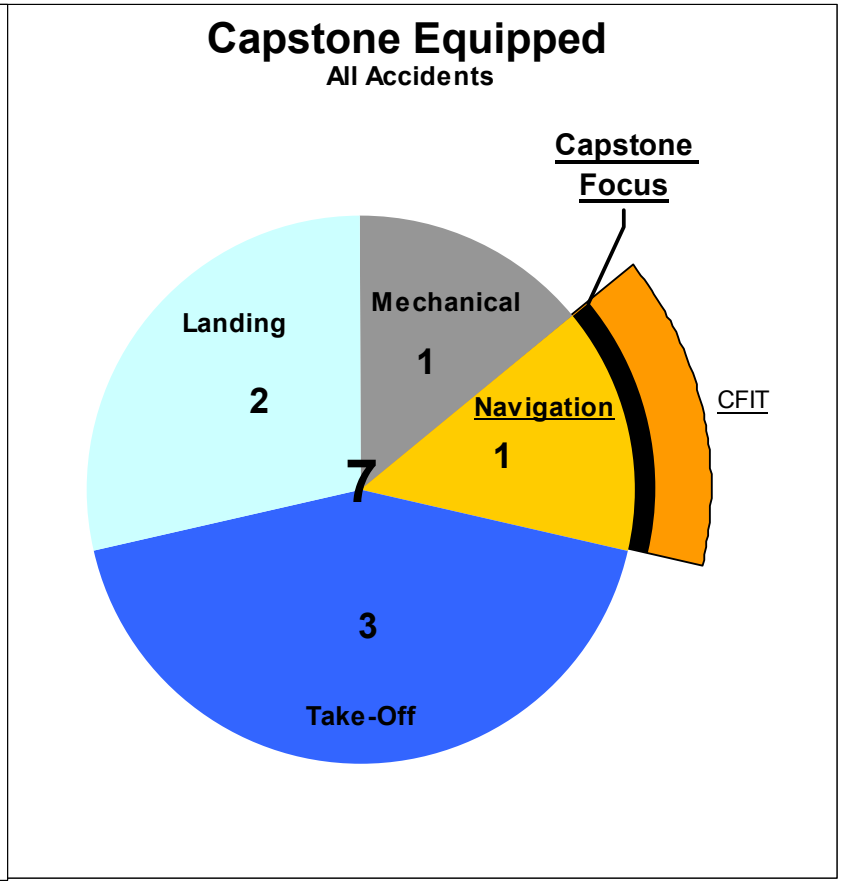
MITRE

CAASD

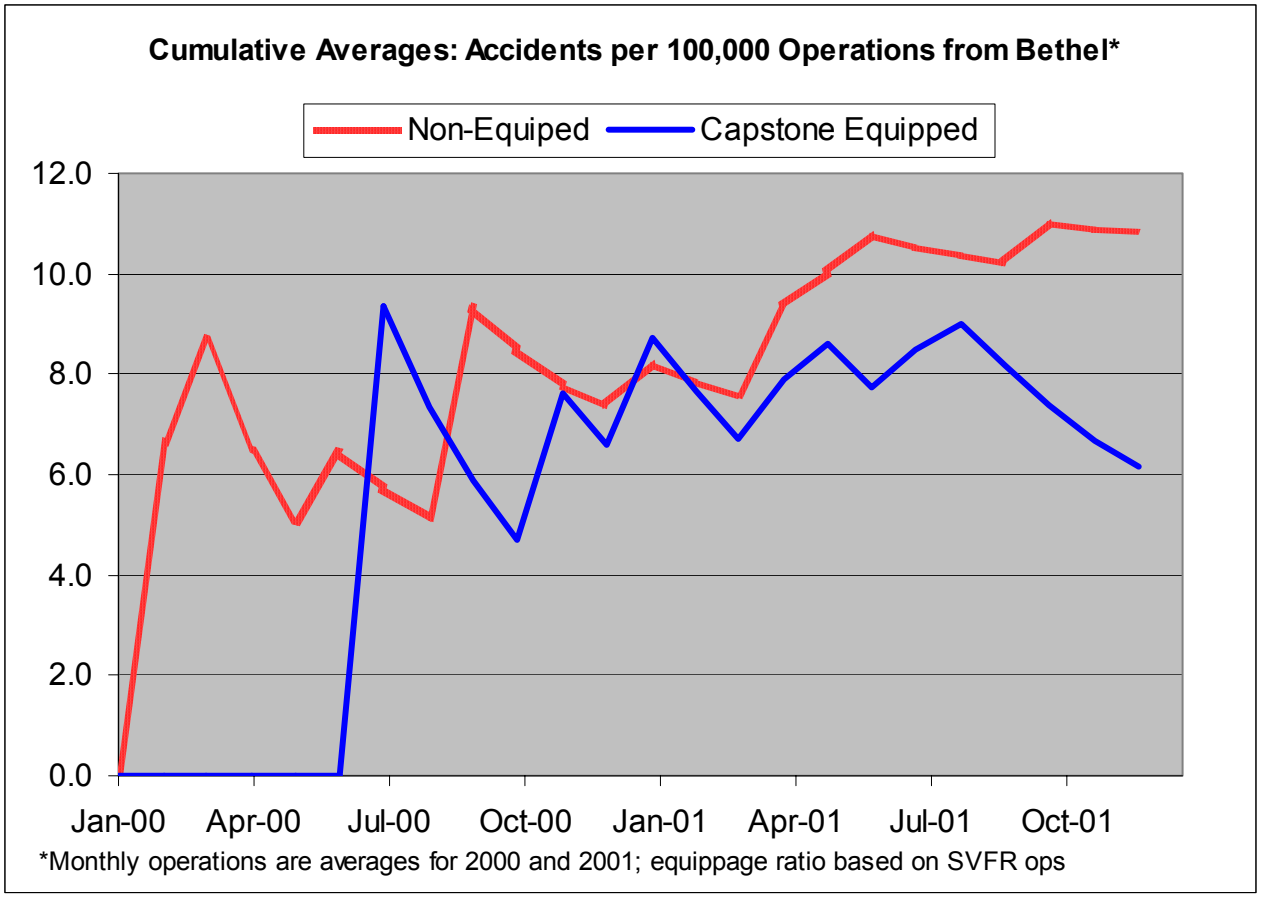
Accidents by Equipped and Non-Equipped Aircraft

YK Delta / Part-135 / 2000-2001





Non-Equipped vs. Capstone Equipped Accident Rates YK Delta / Part-135 / 2000-2001



Interim Assessments

- Too soon for "statistically significant" changes in specific types of accidents or accidents over-all
- Compared to the YK Delta before Capstone, these 2000-2001 results for Part-135 are positive so far:

Accident Causes	Expected	Observed
Lack of Flight Information	1	0
Loss of aircraft in Collisions	1	0
Navigation including CFIT	Reduce from 4 to 3	3
Fuel and Flight Prep Errors	3	0

Additional Details and Updates

- **The Safety Impact of Capstone Phase 1**
  – An Interim Assessment of 2000-2001 (MPW0000150 Revision 2)
  - http://www.alaska.faa.gov/capstone/docs/mitre%20study.pdf

- **Updated analysis is in progress by University of Alaska**
  - **Implementation Progress and Accidents reported through 2002**
  - **Watch** http://www.alaska.faa.gov/capstone